Configuring and Using "lp" Services (Software Issues)

Version 2 - September 30, 1999

Introduction to "lp" Services

The UnixWare "**lp**" services package is a suite of programs designed to allow the integration of one or more printers into the Unix environment, thereby enabling print capabilities from the command line (shell) and application programs. UnixWare has supplied a decent GUI front end which enables setting up both local and remote (network) printers a rather effortless task. However, the **Epson LX-300** printer is not among those directly supported, so its recommended closest (in terms of functionality) cousin, the **Epson FX-850**, is chosen instead. Installation of CRS Build 6.0 (field or 5.4 internal) or later automatically defines and configures an **Epson LX-300** local printer on each Master Processor (MP) with the name **lx300**.

A custom **lp** service printer interface program is responsible for handling the transmission of data to attached printers and converting identified print content (via filters) into that acceptable by the destination printer. However, the standard interface program supplied by UnixWare for the **Epson FX-850** does not take into account the peculiarities of the **LX-300**, which can cause corruption of hardcopy text. Therefore, installation of CRS Build 6.0 or later automatically provides a custom interface program which allows the printer buffer to drain prior to exiting and starting another job (if applicable).

Information on what jobs are queued up for a specific printer are provided, as well as facilities for canceling jobs, reprioritizing jobs and starting and stopping individual printer queues. Though this information is available to UnixWare (and CRS) operators via command line, it is inconvenient to access. Also, UnixWare provides a graphical print monitor but its capabilities are limited and its presentation leaves a lot to be desired. For this reason, installation of CRS Build 6.0 or later provides access to a custom **Print Monitor** which displays generous statistical information regarding the status of printers and jobs queued up on individual printers, allows jobs to be elevated to top priority and allows individual printer queues to be enabled or disabled. The **Print Monitor** may conveniently be started from **crs**, **admin**, **maint** and **oper** popup menus or from the command line via **xprmon**.

Configuring and using **lp** services on CRS is not an intrinsic CRS function and should be thought of as separate from CRS. However, CRS application programs where **Print** facilities are provided now use **lp** services as their print interfaces. Once Build 6.0 or later is installed, all of the above print capability will be available. Should this or a subsequent CRS build be removed, the **Epson LX-300** print service and **Print Monitor** are retained for full use at the command level and through the **Print Monitor**, though, as for **root** login, the monitor must be started from the command line for **admin**, **maint** and **oper** users.

Configuring the Software "lp" Service

As stated previously, configuration of **lp** services on a CRS system is performed automatically and transparently by Builds 6.0 and beyond. No installer/operator intervention is necessary to begin using **lp** services following successful installation of the CRS build. Should CRS system administrators wish to modify **Epson LX-300** printer characteristics established by the CRS build installation program or add local or network printers, use the UnixWare GUI printer administration tool **Printer_Setup** located in the **Admin_Tools** folder of the **root** desktop or the command line version, **lpadmin**, located in **/usr/sbin**.

Using the Print Monitor

The **Print Monitor** is a Windowing Korn Shell (wksh) program which presents a graphical user interface through which an operator can view, submit and delete (own only) print jobs for any printer configured through the UnixWare desktop. Additionally, **root** users may delete a print job owned by any user, promote a print job to the top of the queue and start and stop (enable and disable) the print queue for any configured printer. The **Print Monitor** was designed and written in wksh to facilitate fast and easy modification or addition of capabilities to the base product. It is a substitute for the anemic print monitor supplied in 2.04 UnixWare.

The **Print Monitor** may be started from the **crs**, **admin**, **maint**, or **oper** popup menu. Alternatively, any user may run the **Print Monitor** by typing **xprmon &** at a command prompt, unless the current directory is **xprmon**'s home directory of **/usr/X/bin**, in which case the monitor may be started via **./xprmon &**. If **/usr/X/bin** is not in **PATH**, then the full pathname of **/usr/X/bin/xprmon &** may always be used to start up **Print Monitor**.

The **Print Monitor** consists of a list which occupies the main part of the window above a single row of command buttons. The list displays (in three second refresh intervals) the jobs queued up for the currently-selected printer. The top-most job is either the next job to print if the queue is disabled or the currently printing job if it is enabled. Subsequent jobs are queued up behind the last job. Each line is composed of five distinct fields of information: simple rank in queue (**1st**, **2nd**, **3rd**, etc.), owner of job (**root**, **crs**, **admin**, etc.), job ID (in the format **<printer name>-<numerical job ID>**; not of much concern in the GUI environment), file to print (full path or **...** if unknown) and size of job to print (in bytes). The currently-selected printer is indicated following the **Print Monitor** title in the window bar. Following the printer display is the currently-selected printer's status in square brackets (**[** Ready **]** to indicate that the printer is ready to print or is currently printing a job, **[!! Down !!]** to indicate that the printer queue has been disabled or the printer is not responding to RS-232 communication attempted by **lp** services and **[?? Unknown ??]** to indicate a status of unknown). The currently-selected printer defaults to the UnixWare default printer (set by CRS build installation software as **lx300)**. The currently-selected printer may be changed at any time by clicking the **Printer...** button.

The **Submit Job...** button brings up the **Submit File To Printer** common file dialog box. This dual-paned dialog is standard in Motif and is itself used in CRS when a disk file should be specified by the operator to complete an operation (e.g., create weather message from diskette text file). The operator should navigate the directories (left pane) and use the **Filter** string to restrict the list of files displayed in the associated directory. The selected file appears in the **Selection** text box at the bottom of the dialog. Alternatively, the user may type the file's full pathname directly into the **Selection** box if it is known. Clicking **Original** submits the original file directly to **lp** services while clicking **Copy** tells **lp** services to make a copy of the original file and queue it instead. **Original** should be used (especially with large, i.e., greater than 1MB, text files) when the original file will not be modified, moved and/or deleted during the entire printing process. **Copy** should be used when the original may be modified, moved and/or deleted during printing. The **Cancel** button may be used to dismiss this dialog without submitting a file to print. Any valid UnixWare user may submit jobs to a printer unless their login name is specifically entered into the **Deny** list or excluded from the **Allow** list for a certain printer (access **Printer_Setup** as **root** to alter the access lists for a printer). Only text files should be submitted through the **Print Monitor** application.

The **Force EOJ** (Force End-Of-Job) button will remove the job at the top of the queue (current) and proceed to handle the next job in line if the printer is enabled. **Print Monitor** only recognizes this command when the current job has a status of **[Data Tx Complete]** displayed at the rightmost side of its entry. This annunciator indicates that the computer has uploaded all text data of the associated print file to the selected printer and is waiting for the printer to finish printing the last buffer-full of data. This command button allows an operator to bypass the remaining time of the original 300 seconds (5 minutes) of timeout on the associated printer buffer drain so the next job begins printing immediately. This is required only for the **Epson LX-300** printer since it will corrupt the last buffer-full (4K) of print data if the UnixWare printer interface script ends prior to the printer finishing the job. Thus, the timeout is enacted only to print jobs sent to the **Epson LX-300** printer; for all other printers, **[Data Tx Complete]** will not be displayed and the **Force EOJ** button will have no effective function. Operators must not select **Force EOJ** prior to the **Epson-LX300** finishing the current print job or the end of the current or beginning of the next job may be corrupted. Only the owner of the job or **root** is allowed to enact **Force EOJ** on it.

The **Remove Job** button will cancel printing of the selected job. Jobs which haven't printed will simply be removed from the queue list. If the currently-printing job is canceled and not all of the file data has been sent to the printer, data transfer to the printer of the current job will cease and a cancellation banner will be printed after the printer drains (by printing) its onboard buffer. Only the owner of the job or **root** is allowed to remove a queued print job.

The **Expedite Job** button promotes the currently-selected job to the top of the print queue. Any job currently printing will finish prior to starting the expedited job. Only the **root** user can expedite a queued job.

The **Disable Queue** or **Enable Queue** button has a dual function. It displays the opposite of the current printer's queue status and, when pressed, enacts the function displayed on the face. For example, if **Disable Queue** is displayed, the currently-selected printer's queue is enabled (meaning that jobs queued will subsequently print). If this button is pressed, the currently-selected printer's queue will be disabled (meaning that jobs queued will be held pending re-enable of printer queue), and **Enable Queue** will be displayed on the button face once the printer queue status is verified as disabled. Also, the printer status in the window titlebar will change to **[!! Down !!]** to indicate that the printer is not ready to print. For various reasons, if a job is queued, the printer status may transition to down if there is a problem printing; this button will change state accordingly to stay in sync with the printer status. Cycling this button will usually reset a printer which is labeled as **[!! Down !!]** but in all other aspects is ready to print. Only the **root** user may enable or disable a printer queue.

The **Printer...** button brings up the **Select Printer** dialog box which contains a list of system-configured (local and remote) printers to select as the current printer. The **Print Monitor** displays jobs and enacts operator commands on the currently-selected printer. When **Print Monitor** starts, it auto-selects the UnixWare default system printer (**_DEFAULT_PRINTER**) as the currently-selected printer. To print to another configured printer, simply click the desired printer or type its name into the text box just above the command buttons. The **OK** command button accepts the current selection. The **Cancel** button retains the printer selected before this dialog was popped up. The **Help** button brings up an error dialog saying that no help is available for this dialog (it could not be display-inhibited from wksh). Any UnixWare user may change the currently-selected printer.

The **Dismiss** button exits the **Print Monitor** wksh script, effectively bringing down the **Print Monitor**. This command button may be selected by any UnixWare user.

The **Print Monitor**, though it does not contain an online help facility, is very simple to use and its source is open to inspection and modification. A number of error dialogs exist to help cue operators in to fixing whatever is wrong in regards to carrying out a supported operation.

Printing From Applications

Printing from a UnixWare, CRS or third party application should be effected via selecting a **Print** command button or menu item (or equivalent) when viewing the document to be printed. For example, in CRS, click the **Print** button on the associated CRS application screen (currently, **Broadcast Cycle**, **System Reports** and **Activity Logs**) while viewing the report to be printed. Printing of these documents is not initiated through the **Print Monitor**, though the print job will appear as any other job in the **Print Monitor** under the current UnixWare system default printer's queue list. This system default printer is set on a per user (login) basis and can be identified and/or changed by examining the printer icons in **Printer_Setup** of the **Admin_Tools** folder. The default printer icon will incorporate a blue arrow pointing inward toward the printer image. Other applications may allow selection of the destination printer from an additional printer dialog box, like **Print Monitor**.

The realtime, streaming **CRS Log Printing** function does not utilize **lp** services but, rather, prints directly to the raw print device **/dev/term/a02s**. Since **lp** owns this device and has priority, any jobs queued for printing while the log printing function is active will cause the log printing function to be deactivated and **lp** to print the queued jobs in their entirety. An **Alert Monitor** message will be output to remind the operator that the log printing function has been disabled. It is the CRS system operator's responsibility to re-activate the log printing function via **Start/Stop Log Printing** in the **System** menu of the **CRS Main Menu**, if so desired.

Printing selected passages of the **CRS Site Operator's Manual** from the **HyperHelp** application is, unfortunately, not possible since **HyperHelp**'s output print format is Postscript and the **Epson LX-300** is a dot matrix printer incapable of interpreting the Postscript language. However, any Postscript-compatible printer may be substituted for the **Epson LX-300** or added as a local or network printer and **HyperHelp** jobs queued for this printer instead of the **LX300**, once **HyperHelp** is configured properly.

Procedure to Enable LP Services

This procedure also is included as Section 4 of the CRS Build 6.0 Installation Procedures. After installation of LP services as a result of the Build 6.0 installation, the operator must enable the Print Queue. Otherwise, queued print jobs will not print.

To verify this, select the second button from the top (Print Monitor) in the CRS Utilities window. (The CRS Utitlities window can be accessed by l down the left mouse button and moving the mouse cursor to a blank work area and then releasing the button after the desired utility is selected.) This will cause the Print Monitor window to be displayed on the screen. The printer status displayed in the Print Monitor Title Bar has three settings:

[Ready **]** -> indicates the printer is ready
[!! Down !!] -> indicates the printer queue has been disabled or the printer is not responding
[?? Unknown ??] -> indicates an unknown status

After the initial installation of LP services in Build 6.0, the printer status will be **Down**, and you will not be able to print. This will only occur after the initial installation of the LP services capability. The enabling of the Print Queue is restricted to root privilege, so you will not be able to do this from the Print Monitor program that is started from the CRS Utilities window. The following procedure must be executed only once, after the initial installation of LP services in Build 6.0. It will not be repeated for future installations.

Enable the Print Queue Procedure

1) Click on Maintenance and select Unix Shell.

2) Log in as root, enter **su** and enter the password.

3) Start the print monitor program: **/usr/X/bin/xprmon &**

4) Verify that the printer status is **[!! Down !!]**

5) Verify that the fifth function button is labeled **Enable Queue**, which indicates that the queue is currently disabled.

6) Click the **Enable Queue** function button to enable the queue.

7) Verify that the printer status becomes **[** Ready **]**. If the status is **[?? Unknown ??]**, click the **Enable Queue** function button again to change the printer status to **[!! Down !!]**. Click it again and verify that the status is **[** Ready **]**.

8) Verify that the fifth function button from the left is now labeled **Disable Queue**, which indicates that the queue is currently enabled and by clicking it, the queue will become disabled.

9) Leave the printer in the **[** Ready **]** state.

10) Keep entering exit until you Log out and the UNIX shell is closed.